

resulting average pressure is 29.84 for the whole globe, being 29.910 for the northern and 29.774 for the southern hemispheres respectively. If we increase these figures by 0.06, we shall make an approximate allowance for the diminution of gravity with altitude. On the other hand, there is a slight diminution of this computed mass, amounting to about one per cent, owing to the fact that we have assumed air to exist where the continents really are.

The problem, therefore, resolves itself into this. The average pressure to be used is about 29.90 inches, or 2.492 feet of mercury. A cubic foot of mercury weighs about 848 pounds, therefore, the weight of the atmosphere above any square foot of the earth's surface is 2,117 pounds. If we multiply this by the area of the globe in square feet, we get the total weight of the atmosphere. According to Woodward's Smithsonian Tables, page LXV, this area is 198,940,000 square miles, and each square mile is $5,280 \times 5,280$ square feet. The result is 10,392 followed by fifteen figures, or $10,392 \times 10^{15}$.

The mass of the atmosphere is therefore so small a fraction of that of the solid earth that it is represented by $\frac{1}{112,500}$ or about one one millionth.

The preceding value is the lower limit of the mass of the atmosphere. Our knowledge of the physical and mechanical conditions existing in the upper air is so unsettled at present that, according to Prof. R. S. Woodward, there is a possibility that there may be nearly 1,000 times as much air belonging to our atmosphere.

THE WEATHER BUREAU IN ALASKA.

The Chief of Bureau has issued orders transferring the central station of the Alaskan section of the Climate and Crop Service from Sitka to Eagle on the Yukon near the British line. Mr. H. L. Ball, the section director at Sitka, will return to the States, and the work in Alaska will be placed in the charge of Mr. U. G. Myers, who has been connected with the Weather Bureau for a number of years, and for the past twelve months has been in the region in which the new central station will be located. Owing to poor facilities for communication Mr. Ball found it impracticable to establish stations at interior points, and it is believed that by the change that has been ordered it will be possible to establish a number of stations in the upper Yukon region, from which it has been heretofore impossible to procure meteorological observations. The Bureau has already in its possession records covering several years of observations at Sitka, and also at other stations in the coast region, but at points far in the interior it has been almost wholly impossible to secure observations, although numerous efforts in that direction have been made. Mr. Myers' residence of the past twelve months in Alaska, and his determination to remain in that territory for some years to come, encourages the Chief of the Weather Bureau to believe that in the next few years most valuable information will be obtained concerning the climate of this region, of which so little is at present known. While the value of the observations at Eagle alone will amply justify the change that has been ordered, it is expected that Mr. Myers, with headquarters at Eagle, will be able to establish a number of voluntary stations at hitherto inaccessible places in the interior. Mr. Myers is a resolute and courageous young man, possessing mental and physical qualifications which especially fit him for the arduous duties and hardships involved in a residence in this inhospitable region. The station at Sitka will be maintained under Prof. C. C. Georgeson, who has charge of the agricultural experiment work in Alaska. Professor Georgeson will also have his assistants conduct meteorological observations at various points, at which they may be located in the prosecution of the experimental work under their charge.

SOLAR HALO.

Mr. James Hyatt, of Stanfordville, Dutchess County, N. Y., reports a halo seen February 1, 1899, between 3 and 3:30 p. m., eastern standard time, consisting of an arc of prismatic colors, and convex to the sun, distant 46° from it and subtending an angle of about 50° . There were no other attending fragments of a halo and no parhelia.

It is rather rare that one observes this portion of a halo without any attending portions, but it is by no means unknown. The occurrence depends upon a rather rare combination of temperature and the altitude of the sun. This halo can only be formed when the sun's rays pass through crystalline needles of ice that are slowly descending through the atmosphere. The rays must enter the prism through faces or facets that are inclined to each other at an angle of $54^\circ 44'$. In higher latitudes, where halos frequently occur, the sun is generally so low down that a great variety of halo phenomena can be seen; but in these southern latitudes, when the ice needles are favorably located in the air, the sun is so high up that we see only the upper portion of the halo. On February 13, 1895, between 8:45 and 9:15 a. m., a similar phenomenon was seen at Washington, which is described and explained at page 56 of the MONTHLY WEATHER REVIEW for that date.

FREQUENCY OF INJURIOUS PHENOMENA.

A correspondent at Beaufort, S. C., says:

Why do we now have disastrous cyclones in this neighborhood about every two years, whereas twenty-five years ago they were of rare occurrence? And, again, why do we now have unusually severe cold spells, whereas formerly it was only at long intervals that orange trees were killed by cold snaps? Are not these changes due to the destruction of forests in the northwest?

The answers to these questions may interest many of our readers and are about as follows:

(a) The destruction of forests in "the northwest," no matter whether this term refers to the Appalachian Range or the Ohio Valley and Michigan, or Wisconsin and Lake Superior, or the Rocky Mountain region, or the Pacific Coast States, can not have had any appreciable influence upon the climate of the coast of South Carolina.

(b) An examination of the records that are available for study, during the past hundred years, shows that there has been no remarkable increase in the number of either cyclones or cold spells. The word "cyclone" is evidently used by our correspondent in the sense of an extensive storm, similar to the West Indian hurricanes, and not in the sense used in the Western States, where it has unfortunately been misapplied to the tornado.

(c) The atmosphere of the whole globe is everywhere subject to irregular variations, as well as to regular daily and annual variations in its temperature, moisture, winds, and storms. These irregular variations do not appear to depend directly upon anything outside of the air, such as the sun and moon above us, the changes produced by man on the surface of the earth below. They are as peculiar to and inherent in the atmosphere as the currents and ebullitions in a pot of boiling water or the eddies in a river during a flood are peculiar to those fluids. The cause and probable continuance of any unusual frequency of storms or frosts can not at present be definitely stated. If the records of these phenomena were precise and definite and extended over many years, for any given locality, we could calculate the probability that two or more would accidentally occur within a short period of time. Such computations have been made for other places, and have shown that there is no reason to think that a rare combination of years of disastrous meteorological phenomena will recur more than two or three times in a century.